

**REMARKS**

Claims 1 and 9 have been amended to recite that the L-lactic acid unit-containing resin (1) predominantly contains L-lactic acid units and has an optical purity of at least 90%, and that the D-lactic acid unit-containing resin (2) predominantly contains D-lactic acid units and has an optical purity of at least 90%. Claims 12 and 13 have been amended to conform with the amendment to claim 9. Claim 11 has been amended to delete those portions which do not further limit claim 9 from which claim 11 depends. Also, claims 1, 9, 12 and 13 have been amended to use the term "obtained" instead of "obtainable" for clarification. The amendment to claim 11 as well as the amendments to claims 1, 9, 12 and 13 substituting the term "obtained" for "obtainable" do not narrow the scope of the subject claims.

Support for the amendment relating to optical purity, is found, for example, bridging pages 5-6 of the specification (among L-lactic acid and D-lactic acid for use in the invention, 90% lactic acid is preferred); at page 9, lines 2-5; and in reference to Example 4 at pages 20-21 of the specification (copolymerizing 30 kg of 90% L-lactic acid and 30 g of corn starch to prepare resin (1), and copolymerizing 30 kg of 90% of D-lactic acid and 30 g of corn starch to prepare resin (2)).

Those skilled in this field of art understand that the term "purity" as used in the present specification means "optical purity." Namely, for example, the term "a L-lactic acid unit-containing resin having an optical purity of 90%" means that the resin contains 90% of L-lactic acid and 10% of other components such as water and a small amount of D-lactic acid. Optical purity is conventionally defined as follows:

$$\begin{aligned} &\text{Optical Purity (\%)} \\ &= (\text{Specific Rotation of Measured Resin}) / \\ &\quad (\text{Specific Rotation of Polymer having Optical Purity of 100\%}) \times 100 \end{aligned}$$

Review and reconsideration on the merits are requested.

Claims 1, 7-9 and 11-13 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,984,443 to Kuroki. Kuroki et al was cited as disclosing a polyester resin composition and molded article meeting each of the terms of the rejected claims. Relative to present claim 1, the Examiner cited aliphatic polyesters (2) comprising polyfunctional polysaccharides and lactic acid units, where the term "lactic acid" includes L-lactic acid and D-lactic acid (col. 4, lines 8-9 and 18-21). Component (2) is said to be formed by reacting polyfunctional saccharides, including cellulose and starch, with lactic acid units (citing col. 4, lines 51-57). Relative to claim 12, Kuroki et al was cited as teaching components (3) which are aliphatic polyesters comprising aliphatic polyvalent carboxylic acid units, aliphatic polyvalent alcohol units and lactic acid units (col. 4, lines 8-12). Production Example 1 (at col. 10) was cited as disclosing polymerization of L-lactic acid having a 0.5 mol% impurity content (presumably D-lactic acid as an inherent impurity). Resin molded articles are said to be disclosed at col. 7, lines 43-52.

Applicants traverse, and respectfully request the Examiner to reconsider in view of the amendment to the claims, the Declaration evidence submitted herewith and the following remarks.

The independent claims are claims 1 (directed to a biodegradable resin composition) and claim 9 (directed to a biodegradable resin molded article). The resin composition of claim 1 comprises resin (1) predominantly containing L-lactic acid units and having an optical purity of

at least 90% which is a copolymer obtained by copolymerizing at least L-lactic acid and a saccharide, and resin (2) predominantly containing D-lactic acid units and having an optical purity of at least 90% which is a copolymer obtained by copolymerizing at least D-lactic acid and a saccharide.

Kuroki et al discloses a resin composition obtained by copolymerizing lactic acid and a saccharide, where the lactic acid includes L-lactic acid and D-lactic acid. Kuroki et al also allows for use of poly(L-lactic acid) of which the constitutive units are of L-lactic acid alone, poly(D-lactic acid) of which the constitutive units are of D-lactic acid alone, and poly(DL-lactic acid) that comprises L-lactic acid units and D-lactic acid units (column 4, lines 23-28). The Examiner's point is that because a racemic mixture contains both L- and D-lactic acid, a copolymer resin obtained by copolymerizing lactic acid (containing both L-acid and D-lactic acid) and a saccharide provides a product which is both a L-lactic acid unit-containing resin and a D-lactic acid unit-containing resin. In this regard, for example, the Examiner cites to Production Example 1 as disclosing polymerization of L-lactic acid containing a (small) D-lactic acid impurity.

Using the same rationale, the Examiner considered claim 9 as reading on the disclosure at col. 4, lines 3-17 of Kuroki et al where the polyester resin may also include (3) aliphatic polyesters comprising aliphatic polyvalent carboxylic acid units, aliphatic polyvalent alcohol units and lactic acid units. Once again, using a racemic mixture, the resins (1) and (2) of rejected claim 9 are said to be satisfied (since they did not require any specific proportion or absolute amount of L-lactic acid to D-lactic acid in the respective resins).

In view of the above, claims 1 and 9 have been amended so as to require two distinct resins (1) and (2) each predominantly containing L-lactic acid units or D-lactic acid units, respectively, so as to have an optical purity of at least 90%.

The amended claims providing a biodegradable resin composition including distinct resins (1) and (2), where resin (1) predominantly contains L-lactic acid units so as to have an optical purity of at least 90% and where resin (2) predominantly contains D-lactic acid units so as to have an optical purity of at least 90%, distinguishes the invention from Kuroki et al which simply discloses use of a racemic mixture containing both L-lactic and D-lactic acid, or that of Production Example 1 containing 0.5 mol % D-lactic acid among lactic acid units constituting the resin. Namely, Kuroki et al does not disclose a resin composition comprising both resin (1) predominantly containing L-lactic acid units and having an optical purity of at least 90%, and resin (2) predominantly containing D-lactic acid units and having an optical purity of at least 90%, and for this reason alone does not anticipate the amended claims.

The significance of providing a biodegradable resin composition having distinct resins (1) and (2) as set forth in the amended claims is shown in the Declaration under 37 C.F.R. § 1.132 of Toru Yano submitted herewith. Therein, Experimental Examples I to III were prepared as in Example 6 of the specification, except that a L-lactic acid unit containing resin having an optical purity of 98% (i.e., resin A in the Table) was used as the Resin (1); and three types of D-lactic acid-containing resins having optical purities of 99%, 90% and 85%, respectively (i.e., Resins B, C and D in the Table) were used as the Resin (2). The subject compositions prepared by blending the Resins A to D in the amounts shown in the Table at page 2 of the Declaration were evaluated with respect to maximum tensile strength, elongation at break and heat

deformation temperature. As shown in the Table, the resin compositions of Experimental Examples I and II which were prepared from resins (1) and (2) both having an optical purity of 90% or more provided a heat deformation temperature approximately twice as large as that of the resin composition of Experimental Example III where Resin (2) had an optical purity of 85% (i.e., less than an optical purity of at least 90% as claimed). Applicants believe that the remarkably enhanced heat resistance achieved by the invention is due to the formation of a stereo-complex of poly L-lactic acids and poly D-lactic acid, namely, a double helix of poly lactic acid molecules.

Withdrawal of the rejection and allowance of claims 1, 7-9 and 11-13 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

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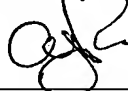
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Respectfully submitted,



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